MPGFYEIVIKVPSDLDEHLPGISDSFVNWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
TEWRRVSKAPEALFFVQFEKGESYFHMHVLVETTGVKSMVLGRFLSQIREKLIQRIYRGIEPTL
PNWFAVTKTRNGAGGGNKVVDECYIPNYLLPKTQPELQWAWTNMEQYLSACLNLTERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDKGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQPVEDISSNRIYKILELNGYDPQYAASVFLGWA
TKKFGKRNTIWLFGPATTGKTNIAEAIAHTVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEVEHEFYVKKGGAKKRPAPSDADISEPKRVRESV
AQPSTSDAEASINYADRYQNKCSRHVGMNLMLFPCRQCERMNQNSNICFTHGQKDCLECFPVSE
SQPVSVVKKAYQKLCYIHHIMGKVPDACTACDLVNVDLDDCIFEQZ

FIG._1

atgccggggttttacgagattgtgattaaggtccccagcgaccttgacgagcatctgcccggca
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ggatctgaatctgattgagcaggcacccctgaccgtggccgagaagctgcagcgcgactttctg
acggaatggcgccgtgtgagtaaggccccggaggccctttttctttgtgcaatttgagaagggag
agagctacttccacatgcacgtgctcgtggaaaccaccggggtgaaatccatggttttgggacg
tttcctgagtcagattcgcgaaaaactgattcagagaatttaccgcgggatcgagccgactttg
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agtgctacatccccaattacttgctccccaaaacccagcctgagctccagtgggcgtggactaa
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acatcgcggaggccatagcccacactgtgcccttctacgggtgcgtaaactggaccaatgagaa
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tccggtgggcaaaggatcacgtggttgaggtggagcatgaattctacgtcaaaaagggtggagc
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tctcaacccgtttctgtcgtcaaaaaggcgtatcagaaactgtgctacattcatcatatcatgg
gaaaggtgccagacgcttgcactgcctgcgatctggtcaatgtggatttggatgactgcatctt
tgaacaataa

FIG._2

MPGFYEIVIKVPSDLDGHLPGISDSFVNWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
TEWRRVSKAPEALFFVQFEKGESYFHMHVLVETTGVKSMVLGRFLSQIREKLIQRIYRGIEPTL
PNWFAVTKTRNGAGGGNKVVDECYIPNYLLPKTQPELQWAWTNMEQYLSACLNLTERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDKGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQPVEDISSNRIYKILELNGYDPQYAASVFLGWA
TKKFGKRNTIWLFGPATTGKTNIAEAIAHTVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEVEHEFYVKKGGAKKRPAPSDADISEPKRVRESV
AQPSTSDAEASINYADRYQNKCSRHVGMNLMLFPCRQCERMNQNSNICFTHGQKDCLECFPVSE
SQPVSVVKKAYQKLCYIHHIMGKVPDACTACDLVNVDLDDCIFEQ

FIG._3

atgccggggttttacgagattgtgattaaggtccccagcgaccttgacgagcatctgcccggca
tttctgacagctttgtgaactgggtggccgagaaggaatgggagttgccgccagattctgacat
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acggaatggcgccgtgtgagtaaggccccggaggccctttttctttgtgcaatttgagaagggag
agagctacttccacatgcacgtgctcgtggaaaccaccggggtgaaatccatggttttgggacg
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agtgctacatccccaattacttgctccccaaaacccagcctgagctccagtgggcgtggactaa
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tctcaacccgtttctgtcgtcaaaaaggcgtatcagaaactgtgctacattcatcatatcatgg
gaaaggtgccagacgcttgcactgcctgcgatctggtcaatgtggatttggatgactgcatctt
tgaacaataa

FIG._4

MPGFYEIVLKVPSDLDEHLPGISDSFVSWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQREFL
VEWRRVSKAPEALFFVQFEKGDSYFHLHILVETVGVKSMVVGRYVSQIKEKLVTRIYRGVEPQL
PNWFAVTKTRNGAGGNKVVDDCYIPNYLLPKTQPELQWAWTNMDQYISACLNLAERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDRGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNASKIMSLTKTAPDYLVGQNPPEDISSNRIYRILEMNGYDPQYAASVFLGWA
QKKFGKRNTIWLFGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTKRLEHDFGKVTKQEVKDFFRWASDHVTEVTHEFYVRKGGARKRPAPNDADISEPKRACPSV
AQPSTSDAEAPVDYADRYQNKCSRHVGMNLMLFPCRQCERMNQNVDICFTHGVMDCAECFPVSE
SQPVSVVRKRTYQKLCPIHHIMGRAPEVACSACELANVDLDDCDMEQ

FIG._5

atgccggggttctacgagatcgtgctgaaggtgcccagcgacctggacgagcacctgcccggca
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ggacttgaatctgattgagcaggcacccctgaccgtggccgaaaagctgcaacgcgagttcctg
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acagctacttccacctgcacatcctggtggagaccgtgggcgtcaaatccatggtggtgggccg
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tctcaacccgtgtctgtcgtcagaaagcggacgtatcagaaactgtgtccgattcatcacatca
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tgacatggaacaataa

FIG._6

MPGFYEIVLKVPSDLDEHLPGISNSFVNWVAEKEWELPPDSDMDPNLIEQAPLTVAEKLQREFL
VEWRRVSKAPEALFFVQFEKGETYFHLHVLIETIGVKSMVVGRYVSQIKEKLVTRIYRGVEPQL
PNWFAVTKTRNGAGGGNKVVDDCYIPNYLLPKTQPELQWAWTNMDQYLSACLNLAERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDRGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNASKIMSLTKTAPDYLVGSNPPEDITKNRIYQILELNGYDPQYAASVFLGWA
QKKFGKRNTIWLFGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIEPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLDHDFGKVTKQEVKDFFRWASDHVTDVAHEFYVRKGGAKKRPASNDADVSEPKRQCTSL
AQPTTSDAEAPADYADRYQNKCSRHVGMNLMLFPCKTCERMNQISNVCFTHGQRDCGECFPGMS
ESQPVSVVKKKTYQKLCPIHHILGRAPEIACSACDLANVDLDDCVSE

FIG._7

atgccggggttctacgagattgtcctgaaggtcccgagtgacctggacgagcacctgccgggca
tttctaactcgtttgttaactgggtggccgagaaggaatgggagctgccgccggattctgacat
ggatccgaatctgattgagcaggcacccctgaccgtggccgaaaagcttcagcgcgagttcctg
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agacctacttccacctgcacgtgctgattgagaccatcggggtcaaatccatggtggtcggccg
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ctgacgcacgtgtcgcagacgcaggagcagaacaaagagaatcagaaccccaattctgacgcgc
cggtcatcaggtcaaaaacctcagccaggtacatggagctggtcgggtggctggtggaccgcgg
gatcacgtcagaaaagcaatggattcaggaggaccaggcctcgtacatctccttcaacgccgcc
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acatcgcggaagccatcgcccacgccgtgcccttctacggctgcgtaaactggaccaatgagaa
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gaatctcaacccgtttctgtcgtcaaaaagaagacttatcagaaactgtgtccaattcatcata
tcctgggaagggcacccgagattgcctgttcggcctgcgatttggccaatgtggacttggatga
ctgtgtttctgagcaataa

FIG._8

MPGFYEIVLKVPSDLDERLPGISNSFVNWVAEKEWDVPPDSDMDPNLIEQAPLTVAEKLQREFL
VEWRRVSKAPEALFFVQFEKGETYFHLHVLIETIGVKSMVVGRYVSQIKEKLVTRIYRGVEPQL
PNWFAVTKTRNGAGGNKVVDDCYIPNYLLPKTQPELQWAWTNMDQYLSACLNLAERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDRGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNASKIMSLTKTAPDYLVGSNPPEDITKNRIYQILELNGYDPQYAASVFLGWA
QKKFGKRNTIWLFGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIEPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFEF
ELTRRLDHDFGKVTKQEVKDFFRWASDHVTDVAHEFYVRKGGAKKRPASNDADVSEPKRECTSL
AQPTTSDAEAPADYADRYQNKCSRHVGMNLMLFPCKTCERMNQISNVCFTHGQRDCGECFPGMS
ESQPVSVVKKKTYQKLCPIHHILGRAPEIACSACDLANVDLDDCVSEQ

FIG._9

atgccggggttctacgagattgtcctgaaggtcccgagtgacctggacgagcgcctgccgggca
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ggatccgaatctgattgagcaggcacccctgaccgtggccgaaaagcttcagcgcgagttcctg
gtggagtggcgccgcgtgagtaaggccccggaggccctctttttttgtccagttcgaaaaggggg
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gatcacgtcagaaaagcaatggattcaggaggaccaggcctcgtacatctccttcaacgccgcc
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gaatctcaacccgtttctgtcgtcaaaaagaagacttatcagaaactgtgtccaattcatcata
tcctgggaagggcacccgagattgcctgttcggcctgcgatttggccaatgtggacttggatga
ctgtgtttctgagcaataa

FIG._10

MPGFYEIVIKVPSDLDEHLPGISDSFVSWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
VQWRRVSKAPEALFFVQFEKGESYFHLHILVETTGVKSMVLGRFLSQIRDKLVQTIYRGIEPTL
PNWFAVTKTRNGAGGGNKVVDECYIPNYLLPKTQPELQWAWTNMEEYISACLNLAERKRLVAQH
LTHVSQTQEQNKENLNPNSDAPVIRSKTSARYMELVGWLVDRGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMALTKSAPDYLVGPAPPADIKTNRIYRILELNGYEPAYAGSVFLGWA
QKRFGKRNTIWLFGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLEHDFGKVTKQEVKEFFRWAQDHVTEVAHEFYVRKGGANKRPAPDDADKSEPKRACPSV
ADPSTSDAEGAPVDFADRYQNKCSRHAGMLQMLFPCKTCERMNQNFNICFTHGTRDCSECFPGV
SESQPVVRKRTYRKLCAIHHLLGRAPEIACSACDLVNVDLDDCVSEQ

FIG._11

atgccgggcttctacgagatcgtgatcaaggtgccgagcgacctggacgagcacctgccgggca
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ggatctgaatctgattgagcaggcacccctgaccgtggccgagaagctgcagcgcgacttcctg
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gaactcacccgccgtctggagcatgactttggcaaggtgacaaagcaggaagtcaaagagttct
tccgctgggcgcaggatcacgtgaccgaggtggcgcatgagttctacgtcagaaagggtggagc
caacaaaagacccgccccccgatgacgcggataaaagcgagcccaagcgggcctgcccctcagtc
gcggatccatcgacgtcagacgcggaaggagctccggtggactttgccgacaggtaccaaaaca
aatgttctcgtcacgcgggcatgcttcagatgctgtttccctgcaagacatgcgagagaatgaa
tcagaatttcaacatttgcttcacgcacgggacgagagactgttcagagtgcttccccggcgtg
tcagaatctcaaccggtcgtcagaaagaggacgtatcggaaactctgtgccattcatcatctgc
tggggcgggctcccgagattgcttgctcggcctgcgatctggtcaacgtggacctggatgactg
tgtttctgagcaataa

FIG._12

MPGFYEIVIKVPSDLDEHLPGISDSFVNWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
VQWRRVSKAPEALFFVQFEKGESYFHLHILVETTGVKSMVLGRFLSQIRDKLVQTIYRGIEPTL
PNWFAVTKTRNGAGGNKVVDECYIPNYLLPKTQPELQWAWTNMEEYISACLNLAERKRLVAHD
LTHVSQTQEQNKENLNPNSDAPVIRSKTSARYMELVGWLVDRGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMALTKSAPDYLVGPAPPADIKTNRIYRILELNGYDPAYAGSVFLGWA
QKRFGKRNTIWLFGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLEHDFGKVTKQEVKEFFRWAQDHVTEVAHEFYVRKGGANKRPAPDDADKSEPKRACPSV
ADPSTSDAEGAPVDFADRYQNKCSRHAGMLQMLFPCKTCERMNQNFNICFTHGTRDCSECFPGV
SESQPVVRKRTYRKLCAIHHLLGRAPEIACSACDLVNVDLDDCVSEQ

FIG._13

atgccggggttttacgagattgtgattaaggtccccagcgaccttgacgagcatctgcccggca
tttctgacagctttgtgaactgggtggccgagaaggaatgggagttgccgccagattctgacat
ggatctgaatctgattgagcaggcacccctgaccgtggccgagaagctgcagcgcgacttcctg
gtccagtggcgccgcgtgagtaaggccccggaggccctcttctttgttcagttcgagaagggcg
agtcctacttccacctccatattctggtggagaccacgggggtcaaatccatggtgctgggccg
cttcctgagtcagattagggacaagctggtgcagaccatctaccgcgggatcgagccgaccctg
cccaactggttcgcggtgaccaagacgcgtaatggcgccggaggggggaacaaggtggtggacg
agtgctacatccccaactacctcctgcccaagactcagcccgagctgcagtgggcgtggactaa
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ctgacccacgtcagccagacccaggagcagaacaaggagaatctgaaccccaattctgacgcgc
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cagaaaaggttcggaaaacgcaacaccatctggctgtttgggccggccaccacgggcaagacca
acatcgcggaagccatcgcccacgccgtgcccttctacggctgcgtcaactggaccaatgagaa
ctttcccttcaacgattgcgtcgacaagatggtgatctggtgggaggagggcaagatgacggcc
aaggtcgtggagtccgccaaggccattctcggcggcagcaaggtgcgcgtggaccaaaagtgca
agtcgtccgcccagatcgatcccacccccgtgatcgtcacctccaacaccaacatgtgcgccgt
gattgacgggaacagcaccaccttcgagcaccagcagccgttgcaggaccggatgttcaaattt
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tccgctgggcgcaggatcacgtgaccgaggtggcgcatgagttctacgtcagaaagggtggagc
caacaagagacccgcccccgatgacgcggataaaagcgagcccaagcgggcctgcccctcagtc
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aatgttctcgtcacgcgggcatgcttcagatgctgtttccctgcaaaacatgcgagagaatgaa
tcagaatttcaacatttgcttcacgcacgggaccagagactgttcagaatgtttccccggcgtg
tcagaatctcaaccggtcgtcagaaagaggacgtatcggaaactctgtgccattcatcatctgc
tggggcgggctcccgagattgcttgctcggcctgcgatctggtcaacgtggatctggatgactg
tgtttctgagcaataa

FIG._14

MPGFYEIVIKVPSDLDEHLPGISDSFVNWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
TEWRRVSKAPEALFFVQFEKGESYFHMHVLVETTGVKSMVLGRFLSQIREKLIQRIYRGIEPTL
PNWFAVTKTRNGAGGNKVVDECYIPNYLLPKTQPELQWAWTNMEQYLSACLNLTERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDKGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQPVEDISSNRIYKILELNGYDPQYAASVFLGWA
TKKFGKRNTIWLFGPATTGKTNIAEAIAHTVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEVEHEFYVKKGGAKKRPAPSDADISEPKRVRESV
AQPSTSDAEASINYADRLARGHSL

FIG._15

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atgccggggttttacgagattgtgattaaggtccccagcgaccttgacgagcatctgcccggca
tttctgacagctttgtgaactgggtggccgagaaggaatgggagttgccgccagattctgacat
ggatctgaatctgattgagcaggcacccctgaccgtggccgagaagctgcagcgcgactttctg
acggaatggcgccgtgtgagtaaggccccggaggccctttttctttgtgcaatttgagaagggag
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ccaaactggttcgcggtcacaaagaccagaaatggcgccggaggcgggaacaaggtggtggatg
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tatggaacagtatttaagcgcctgtttgaatctcacggagcgtaaacggttggtggcgcagcat
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cggtgatcagatcaaaaacttcagccaggtacatggagctggtcgggtggctcgtggacaaggg
gattacctcggagaagcagtggatccaggaggaccaggcctcatacatctccttcaatgcggcc
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taaaattttggaactaaacgggtacgatccccaatatgcggcttccgtctttctgggatgggcc
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acatcgcggaggccatagcccacactgtgcccttctacgggtgcgtaaactggaccaatgagaa
ctttcccttcaacgactgtgtcgacaagatggtgatctggtgggaggaggggaagatgaccgcc
aaggtcgtggagtcggccaaagccattctcggaggaagcaaggtgcgcgtggaccagaaatgca
agtcctcggcccagatagacccgactcccgtgatcgtcacctccaacaccaacatgtgcgccgt
gattgacgggaactcaacgaccttcgaacaccagcagccgttgcaagaccggatgttcaaattt
gaactcacccgccgtctggatcatgactttgggaaggtcaccaagcaggaagtcaaagacttttt
tccggtgggcaaaggatcacgtggttgaggtggagcatgaattctacgtcaaaaagggtggagc
caagaaaagacccgcccccagtgacgcagatataagtgagcccaaacgggtgcgcgagtcagtt
gcgcagccatcgacgtcagacgcggaagcttcgatcaactacgcagacagcttttgggggcaac
ctcggacgagc

FIG._16

MPGFYEIVIKVPSDLDGHLPGISDSFVNWVAEKEWELPPDSDMDLNLIEQAPLTVAEKLQRDFL
TEWRRVSKAPEALFFVQFEKGESYFHMHVLVETTGVKSMVLGRFLSQIREKLIQRIYRGIEPTL
PNWFAVTKTRNGAGGNKVVDECYIPNYLLPKTQPELQWAWTNMEQYLSACLNLTERKRLVAQH
LTHVSQTQEQNKENQNPNSDAPVIRSKTSARYMELVGWLVDKGITSEKQWIQEDQASYISFNAA
SNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQPVEDISSNRIYKILELNGYDPQYAASVFLGWA
TKKFGKRNTIWLFGPATTGKTNIAEAIAHTVPFYGCVNWTNENFPFNDCVDKMVIWWEEGKMTA
KVVESAKAILGGSKVRVDQKCKSSAQIDPTPVIVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKF
ELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEVEHEFYVKKGGAKKRPAPSDADISEPKRVRESV
AQPSTSDAEASINYADRLARGHSL

FIG._17

atgccggggttttacgagattgtgattaaggtccccagcgaccttgacgagcatctgcccggca
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ggatctgaatctgattgagcaggcacccctgaccgtggccgagaagctgcagcgcgactttctg
acggaatggcgccgtgtgagtaaggccccggaggccctttttctttgtgcaatttgagaagggag
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agtgctacatccccaattacttgctccccaaaacccagcctgagctccagtgggcgtggactaa
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tccggtgggcaaaggatcacgtggttgaggtggagcatgaattctacgtcaaaaagggtggagc
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gcgcagccatcgacgtcagacgcggaagcttcgatcaactacgcagacagattggctcgaggac
actctctctga

FIG._18

MELVGWLVDKGITSEKQWIQEDQASYISFNAASNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQ
PVEDISSNRIYKILELNGYDPQYAASVFLGWATKKFGKRNTIWLFGPATTGKTNIAEAIAHTVP
FYGCVNWTNENFPFNDCVDKMVIWWEEGKMTAKVVESAKAILGGSKVRVDQKCKSSAQIDPTPV
IVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKFELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEV
EHEFYVKKGGAKKRPAPSDADISEPKRVRESVAQPSTSDAEASINYADRYQNKCSRHVGMNLML
FPCRQCERMNQNSNICFTHGQKDCLECFPVSESQPVSVVKKAYQKLCYIHHIMGKVPDACTACD
LVNVDLDDCIFEQ

FIG._19

atggagctggtcgggtggctcgtggacaaggggattacctcggagaagcagtggatccaggagg
accaggcctcatacatctccttcaatgcggcctccaactcgcggtcccaaatcaaggctgcctt
ggacaatgcgggaaagattatgagcctgactaaaaccgcccccgactacctggtgggccagcag
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gatcaactacgcagacaggtaccaaaacaaatgttctcgtcacgtgggcatgaatctgatgctg
tttccctgcagacaatgcgagagaatgaatcagaattcaaatatctgcttcactcacggacaga
aagactgtttagagtgctttcccgtgtcagaatctcaacccgtttctgtcgtcaaaaaggcgta
tcagaaactgtgctacattcatcatatcatgggaaaggtgccagacgcttgcactgcctgcgat
ctggtcaatgtggatttggatgactgcatctttgaacaataa

FIG._20

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MATFYEVIVRVPFDVEEHLPGISDSFVDWVTGQIWELPPESDLNLTLVEQPQLTVADRIRRVFL
YEWNKFSKQESKFFVQFEKGSEYFHLHTLVETSGISSMVLGRYVSQIRAQLVKVVFQGIEPQIN
DWVAITKVKKGGANKVVDSGYIPAYLLPKVQPELQWAWTNLDEYKLAALNLEERKRLVAQFLAE
SSQRSQEAASQREFSADPVIKSKTSQKYMALVNWLVEHGITSEKQWIQENQESYLSFNSTGNSR
SQIKAALDNATKIMSLTKSAVDYLVGSSVPEDISKNRIWQIFEMNGYDPAYAGSILYGWCQRSF
NKRNTVWLYGPATTGKTNIAEAIAHTVPFYGCVNWTNENFPFNDCVDKMLIWWEEGKMTNKVVE
SAKAILGGSKVRVDQKCKSSVQIDSTPVIVTSNTNMCVVVDGNSTTFEHQQPLEDRMFKFELTK
RLPPDFGKITKQEVKDFFAWAKVNQVPVTHEFKVPRELAGTKGAEKSLKRPLGDVTNTSYKSLE
KRARLSFVPETPRSSDVTVDPAPLRPLNWNSRYDCKCDYHAQFDNISNKCDECEYLNRGKNGCI
CHNVTHCQICHGIPPWEKENLSDFGDFDDANKEQ

FIG._21

atggctaccttctatgaagtcattgttcgcgtcccatttgacgtggaggaacatctgcctggaa
tttctgacagctttgtggactgggtaactggtcaaatttgggagctgcctccagagtcagattt
aaatttgactctggttgaacagcctcagttgacggtggctgatagaattcgccgcgtgttcctg
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gactgggtcgccatcaccaaggtaaagaagggcggagccaataaggtggtggattctgggtata
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actacctcgtggggagctccgttcccgaggacatttcaaaaaacagaatctggcaaatttttga
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ccatcgcccacactgtgccctttacggctgcgtgaactggaccaatgaaaactttccctttaa
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cggctcccgccagattttggcaagattactaagcaggaagtcaaggacttttttgcttgggcaa
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tgacaacatttctaacaaatgtgatgaatgtgaatatttgaatcggggcaaaaatggatgtatc
tgtcacaatgtaactcactgtcaaatttgtcatgggattccccctgggaaaaggaaaacttgt
cagattttggggattttgacgatgccaataaagaacagtaa

FIG._22

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MELVGWLVDKGITSEKQWIQEDQASYISFNAASNSRSQIKAALDNAGKIMSLTKTAPDYLVGQQ
PVEDISSNRIYKILELNGYDPQYAASVFLGWATKKFGKRNTIWLFGPATTGKTNIAEAIAHTVP
FYGCVNWTNENFPFNDCVDKMVIWWEEGKMTAKVVESAKAILGGSKVRVDQKCKSSAQIDPTPV
IVTSNTNMCAVIDGNSTTFEHQQPLQDRMFKFELTRRLDHDFGKVTKQEVKDFFRWAKDHVVEV
EHEFYVKKGGAKKRPAPSDADISEPKRVRESVAQPSTSDAEASINYADRLARGHSL

FIG._23

atggagctggtcgggtggctcgtggacaaggggattacctcggagaagcagtggatccaggagg
accaggcctcatacatctccttcaatgcggcctccaactcgcggtcccaaatcaaggctgcctt
ggacaatgcgggaaagattatgagcctgactaaaaccgcccccgactacctggtgggccagcag
cccgtggaggacatttccagcaatcggatttataaaatttggaactaaacgggtacgatcccc
aatatgcggcttccgtctttctgggatgggccacgaaaaagttcggcaagaggaacaccatctg
gctgtttgggcctgcaactaccgggaagaccaacatcgcggaggccatagcccacactgtgccc
ttctacgggtgcgtaaactggaccaatgagaactttcccttcaacgactgtgtcgacaagatgg
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aggaagcaaggtgcgcgtggaccagaaatgcaagtcctcggcccagatagacccgactcccgtg
atcgtcacctccaacaccaacatgtgcgccgtgattgacgggaactcaacgaccttcgaacacc
agcagccgttgcaagaccggatgttcaaatttgaactcacccgccgtctggatcatgactttgg
gaaggtcaccaagcaggaagtcaaagacttttccggtgggcaaaggatcacgtggttgaggtg
gagcatgaattctacgtcaaaaagggtggagccaagaaaagacccgcccccagtgacgcagata
taagtgagcccaaacgggtgcgcgagtcagttgcgcagccatcgacgtcagacgcggaagcttc
gatcaactacgcagacagcttttgggggcaacctcggacgagc

FIG._24

MAFSRPLQISSDKFYEVIIRLPSDIDQDVPGLSLNFVEWLSTGVWEPTGIWNMEHVNLPMVTLA
DKIKNIFIQRWNQFNQDETDFFFQLEEGSEYIHLHCCIAQGNVRSFVLGRYMSQIKDSILRDVY
EGKQVKIPDWFSITKTKRGGQNKTVTAAYILHYLIPKKQPELQWAFTNMPLFTAAALCLQKRQE
LLDAFQESEMNAVVQEDQASTAAPLISNRAAKNYSNLVDWLIEMGITSEKQWLTENKESYRSFQ
ATSSNNRQVKAALENARAEMLLTKTATDYLIGKDPVLDITKNRIYQILKLNNYNPQYVGSVLCG
WVKREFNKRNAIWLYGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMLIWWEEGKM
TNKVVESAKAILGGSAVRVDQKCKGSVCIEPTPVIITSNTDMCMIVDGNSTTMEHRIPLEERMF
QIVLSHKLEGNFGKISKKEVKEFFKWANDNLVPVVSEFKVPTNEQTKLTEPVPERANEPSEPPK
IWAPPTREELEEILRASPELFASVAPLPSSPDTSPKRKKTRGEYQVRCAMHSLDNSMNVFECLE
CERANFPEFQSLGENFCNQHGWYDCAFCNELKDDMNEIEHVFAIDDMENEQ

FIG._25

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cctcggatattgatcaagatgtgcctggtttgtctcttaactttgtagaatggctttctacggg
ggtctgggagcccaccggaatatggaatatggagcatgtgaatctccccatggttactctggca
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ccgatcttttgttctggggagatacatgtctcaaattaaagactcaattctgagagatgtgtat
gaagggaaacaggtaaaaatcccggattggttttctataactaaaaccaaacggggagggcaaa
ataagaccgtgactgctgcttatattctgcattacctgattcctaaaaaacaaccggaattaca
atgggcttttaccaatatgccccttttcactgctgctgctttatgcctccaaaagaggcaagag
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gctacatcttcaaacaacagacaagtaaaagcagcacttgaaaatgcccgagcagaaatgctac
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tgggtgaaaagagaattcaacaaaagaaatgccatatggctctacggacctgcgaccaccggaa
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agtgtaaggggtctgtttgtattgaacctactcctgtaataattaccagtaatactgatatgtg
catgattgtggatggaaattctactacaatggaacacagaattcctttggaggaaagaatgttc
cagattgttctttcccataagctggaaggaaattttggaaaaatttcaaaaaaggaggtaaaag
agttttcaaatgggccaatgataatcttgttccagtagtttctgagttcaaagtccctacgaa
tgaacaaaccaaacttactgagcccgttcctgaacgagcgaatgagccttccgagcctcctaag
atatgggctccacctactagggaggagctagaggagatattaagagcgagccctgagctctttg
cttcagttgctcctctgccttccagtccggacacatctcctaagagaaagaaaacccgtgggga
gtatcaggtacgctgtgctatgcacagtttagataactctatgaatgtttttgaatgcctggag
tgtgaaagagctaattttcctgaatttcagagtctgggtgaaaacttttgtaatcaacatgggt
ggtatgattgtgcattctgtaatgaactgaaagatgacatgaatgaaattgaacatgtttttgc
tattgatgatatggagaatgaacaataa

FIG._26

MALSRPLQISSDKFYEVIIRLSSDIDQDVPGLSLNFVEWLSTGVWEPTGIWNMEHVNLPMVTLA
EKIKNIFIQRWNQFNQDETDFFFQLEEGSEYIHLHCCIAQGNVRSFVLGRYMSQIKDSIIRDVY
EGKQIKIPDWFAITKTKRGGQNKTVTAAYILHYLIPKKQPELQWAFTNMPLFTAAALCLQKRQE
LLDAFQESDLAAPLPDPQASTVAPLISNRAAKNYSNLVDWLIEMGITSEKQWLTENRESYRSFQ
ATSSNNRQVKAALENARAEMLLTKTATDYLIGKDPVLDITKNRVYQILKMNNYNPQYIGSILCG
WVKREFNKRNAIWLYGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMLIWWEEGKM
TNKVVESAKAILGGSAVRVDQKCKGSVCIEPTPVIITSNTDMCMIVDGNSTTMEHRIPLEERMF
QIVLSHKLEPSFGKISKKEVREFFKWANDNLVPVVSEFKVRTNEQTNLPEPVPERANEPEEPPK
IWAPPTREELEELLRASPELFSSVAPIPVTPQNSPEPKRSRNNYQVRCALHTYDNSMDVFECME
CEKANFPEFQPLGENYCDEHGWYDCAICKELKNELAEIEHVFELDDAENEQ

FIG._27

atggcactttctaggcctcttcagatttcttctgataaattctatgaagttattattagattat
catcggatattgatcaagatgtccccggtctgtctcttaactttgtagaatggctttctaccgg
agtttgggagcccacgggcatctggaacatggagcatgtgaatctaccgatggtgaccttggca
gagaagatcaagaacattttcatacaaagatggaatcagttcaaccaggacgaaacggacttct
tctttcaactggaagaaggcagtgagtacattcatcttcattgctgtattgcccagggcaatgt
acggtcttttgttctcgggagatatatgtctcagataaaagactctatcataagagatgtatat
gaagggaaacaaatcaagatccccgattggtttgctattactaaaaccaagaggggaggacaga
ataagaccgtgactgcagcatacatactgcattaccttattcctaaaaagcaacctgaactgca
atgggcctttaccaatatgcctttattcactgctgctgctctttgtctgcaaaagcggcaagaa
ttgctggatgcatttcaagaaagtgatttggctgccccttacctgatcctcaagcatcaactg
tggcaccgcttatttccaacagagcggcaaagaactatagcaaccttgttgattggctcattga
aatggggataacatctgagaagcaatggctcactgagaaccgagagagctacagaagctttcaa
gcaacttcttcaaataatagacaagtgaaagctgcactggaaaatgcccgtgctgaaatgttat
tgacaaagactgcaactgattacctgataggaaaagaccctgtcctggatataactaagaatag
ggtctatcaaattctgaaaatgaataactacaaccctcaatacataggaagtatcctgtgcggc
tgggtgaagagagagttcaacaaaagaaacgccatatggctctacggacctgccaccaccggga
agaccaacattgcagaagctattgcccatgctgtacccttctatggctgtgttaactggactaa
tgagaactttccttttaatgattgtgttgataaaatgctgatttggtgggaggagggaaaaatg
actaataaggttgttgaatctgcaaaagcaattttgggagggtctgctgtccgggtagaccaga
aatgtaaaggatctgtttgtattgaacctactcctgtaattattactagtaatactgatatgtg
tatgattgttgatggcaactctactacaatggaacatagaataccattagaggagcgtatgttt
caaattgtcctatcacataaattggagccttcttttggaaaaatttctaaaaaagaagtcagag
aatttttcaaatgggccaatgacaatctagttcctgttgtgtctgagttcaaagtccgaactaa
tgaacaaaccaacttgccagagcccgttcctgaacgagcgaacgagccggaggagcctcctaag
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ggtatgattgtgctatatgtaaagagttgaaaaatgaacttgcagaaattgagcatgtgtttga
gcttgatgatgctgaaaatgaacaataa

FIG._28

MAFSRPLQISSDKFYEVIIRLPSDIDQDVPGLSLNFVEWLSTGVWEPTGIWNMEHVNLPMVTLA
DKIKNIFIQRWNQFNQDETDFFFQLEEGSEYIHLHAVCPGECRSFVLGRYMSQIKDSILRDVYE
GKQVKIPDWFSITKTKRGGQNKTVTAAYILHYLIPKKQPELQWAFTNMPLFTAAALCLQKRQEL
LDAFQESEMNAVVQEDQASTAAPLISNRAAKNYSNLVDWLIEMGITSEKQWLTENKESYRSFQA
TSSNNRQVKAALENARAEMLLTKTATDYLIGKDPVLDITKNRIYQILKLNNYNPQYVGSVLCGW
VKREFNKRNAIWLYGPATTGKTNIAEAIAHAVPFYGCVNWTNENFPFNDCVDKMLIWWEEGKMT
NKVVESAKAILGGSAVRVDQKCKGSVCIEPTPVIITSNTDMCMIVDGNSTTMEHRIPLEERMFQ
IVLSHKLEGNFGKISKKEVKEFFKWANDNLVPVVSEFKVPTNEQTKLTEPVPERANEPSEPPKI
WAPPTREELEEILRASPELFASVAPLPSSPDTSPKRKKTRGEYQVRCAMHSLDNSMNVFECLEC
ERANFPEFQSLGENFCNQHGWYDCAFCNELKDDMNEIEHVFAIDDMENEQ

FIG._29

atggcattttctaggcctcttcagatttcttctgacaaattctatgaagttatcatcaggctac
cctcggatattgatcaagatgtgcctggtttgtctcttaactttgtagaatggctttctacggg
ggtctgggagcccaccggaatatggaatatggagcatgtgaatctccccatggttactctggca
gacaaaatcaagaacattttcatccagagatggaaccaattcaatcaggacgaaacggatttct
tctttcaattggaagaaggcagtgagtacatccatctgcatgctgtatgcccaggggaatgtcg
atcttttgttctggggagatacatgtctcaaattaaagactcaattctgagagatgtgtatgaa
gggaaacaggtaaaaatcccggattggttttctataactaaaaccaaacggggagggcaaaata
agaccgtgactgctgcttatattctgcattacctgattcctaaaaaacaaccggaattacaatg
ggcttttaccaatatgccccttttcactgctgctgctttatgcctccaaaagaggcaagagtta
ctggatgcttttcaggaaagtgagatgaatgctgtagtgcaggaggatcaagcttcaactgcag
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gggtatcacctctgaaaaacagtggctaactgaaaataaagagagctaccggagctttcaggct
acatcttcaaacaacagacaagtaaaagcagcacttgaaaatgcccgagcagaaatgctactaa
caaaaactgccacagactatttgattggaaaagacccagttctggacattactaaaaatcggat
ctatcaaattctgaagttgaataactataaccctcaatatgtagggagcgtcctatgcggatgg
gtgaaaagagaattcaacaaaagaaatgccatatggctctacggacctgcgaccaccggaaaga
ccaacatagccgaggctattgcccatgctgtacccttctatggctgtgttaactggactaatga
gaacttcccatttaatgactgcgttgataaaatgcttatatggtgggaggagggaaaaatgacc
aataaagtagtggaatccgcaaaagcgatactgggggggtctgctgtacgagttgatcaaaagt
gtaaggggtctgtttgtattgaacctactcctgtaataattaccagtaatactgatatgtgcat
gattgtggatggaaattctactacaatggaacacagaattcctttggaggaaagaatgttccag
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acaaaccaaacttactgagcccgttcctgaacgagcgaatgagccttccgagcctcctaagata
tgggctccacctactagggaggagctagaggagatattaagagcgagccctgagctctttgctt
cagttgctcctctgccttccagtccggacacatctcctaagagaaagaaaacccgtggggagta
tcaggtacgctgtgctatgcacagtttagataactctatgaatgtttttgaatgcctggagtgt
gaaagagctaattttcctgaatttcagagtctgggtgaaaacttttgtaatcaacatgggtggt
atgattgtgcattctgtaatgaactgaaagatgacatgaatgaaattgaacatgtttttgctat
tgatgatatggagaatgaacaataa

FIG._30

RPELQWAFTNMPLFTAAALCLQKRQELLDAFQESDLAAPLPDPQASTVAPLISNRAAKNYSNLV
DWLIEMGITSEKQWLTENRESYRSFQATSSNNRQVKAALENARAEMLLTKTATDYLIGKDPVLD
ITKNRVYQILKMNNYNPQYIGSILCGWVKREFNKRNAIWLYGPATTGKTNIAEAIAHAVPFYGC
VNWTNENFPFNDCVDKMLIWWEEGKMTNKVVESAKAILGGSAVRVDQKCKGSVCIEPTPVIITS
NTDMCMIVDGNSTTMEHRIPLEERMFQIVLSHKLEPSFGKISKKEVREFFKWANDNLVPVVSEL
KVRTNEQTNLPEPVPERANEPEEPPKIWAPPTREELEELLRASPELFSSVAPIPVTPQNSPEPK
RSRNNYQVRCALHTYDNSMDVFECMECEKANFPEFQPLGENYCDEHGWYDCAICKELKNELAEI
EHVFELDDAENEQ

FIG._31

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cgacctgaactgcagtgggcctttaccaatatgcctttatttactgctgctgctctttgtctgc
aaaagcggcaagaattgctggatgcatttcaagagagtgatttggctgccccttacctgatcc
tcaagcatcaactgtggcaccgcttatttccaacagagcggcaaagaactatagcaaccttgtt
gattggctcattgaaatgggcataacatctgagaagcaatggctcactgagaaccgagagagct
acagaagctttcaagcaacttcttcaaataatagacaagtgaaagctgcactggagaatgcccg
tgctgaaatgctattaacaaagactgcaactgattacctgataggaaaagaccctgtcctggat
ataactaagaacagggtctatcaaattctgaaaatgaataactacaaccctcaatacataggaa
gtatcctgtgcggctgggtgaagagagagttcaacaaaagaaacgccatatggctctacggacc
tgccaccaccgggaagaccaacattgcagaagctattgcccatgctgtacccttctatggctgc
gttaactggactaatgagaactttccttttaatgattgtgttgataagatgctgatttggtggg
aggagggaaaaatgactaataaggttgttgaatctgcaaaagcaattttgggagggtctgctgt
ccgggtagaccagaaatgtaaaggatctgtttgtattgaacctactcctgtaattattaccagt
aatactgatatgtgtatgattgttgatggcaactctactacaatggaacatagaataccattag
aggagcgcatgtttcaaattgtcctatcacataaattggagccttctttcggaaaaatatctaa
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aaagtccgaacgaatgaacaaaccaacttgccagagcccgttcctgaacgagcgaacgagccag
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agaagcaggaacaattaccaggtacgctgtgctttgcatacttatgacaattctatggatgtct
ttgaatgtatggaatgtgagaaggcaaatttcctgaatttcaacctctgggagaaaattattg
tgatgaacatgggtggtatgattgtgctatatgtaaagaattgaaaaatgaacttgcagaaatt
gagcatgtgtttgagcttgatgatgctgaaaatgaacaataa

FIG._32

MAQACLSLSWADCFAAVIKLPCPLEEVLSNSQFWQYYVLCKDPLDWPALQVTELAHGWEVGAYC
AFADALYLYLVGRLADEFSAYLLFFQLEPGVENPHIHVVAQATQLSAFNWRRILTQACHDMALG
FLKPDYLGWAKNCVNIKKDKSGRILRSDWQFVETYLLPKVPLSKVWYAWTNKPEFEPIALSAAA
RDRLMRGNALCNQPGPGPSFGDRAEIQGPPIKKTKASDEFYTLCHWLAQEGILTEPAWRQRDLD
GYVRMHTSTQGRQQVVSALAMAKNIILDSIPNSVFATKAEVVTELCFESNRCVRLLRTQGYDPV
QFGCWVLRWLDRKTGKKNTIWFYGVATTGKTNLANAIAHSLPCYGCVNWTNENFPFNDAPDKCV
LFWDEGRVTAKIVESVKAVLGGQDIRVDQKCKGSSFLRATPVIITSNGDMTVVRDGNTTTFAHR
PAFKDRMVRLNFDVRLPNDFGLITPTEVREWLRYCKEQGDDYEFPDQMYQFPRDVVSVPAPPAL
PQPGPVTNAPEEEILDLLTQTNFVTQPGLSIEPAVGPEEEPDVADLGGSPAPAVSSTTESSADE
DEDDDTSSSGDHRGGGGGVMGDLHASSSSFFTSSDSGLPTSVNTSDTPFSFSPVPVHHHGPPTL
LPTSRPTRDLARGRPSFRQYEPLKGRCADSTTFGRPSWAAPCAVYNTAELTRRGAGVRVVKGSR
PGAISGK

FIG._33

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atggctcaagcttgtctttctctgtcttgggcagattgctttgccgctgtcattaagttgccat
gtcccctcgaagaggtgctgagcaacagccagttttggcaatactatgttctctgtaaagatcc
gcttgactggccggccttacaggtcactgagctggctcatggttgggaggtgggtgcgtactgt
gcgtttgctgatgctttgtatttgtacctggtgggcagactagcagacgagtttagtgcgtact
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ccagttgtcggcatttaactggcgtcgcattttaactcaggcatgtcatgacatggctctgggg
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cgggacaggctgatgagaggcaacgcactttgtaatcagccgggaccggggccgtcttttggag
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ggctatgtgcgtatgcacacctctactcaggggaggcagcaggtggtgtctgctcttgccatgg
ccaaaaacatcatattggatagcattccaaactctgtgtttgccacaaaggcagaagtggtcac
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gccaagacatcagagtggatcagaagtgtaaggggagctctttcttaagggctaccccagtcat
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cctgcctttaaggaccgcatggtccgcttaaattttgatgtgaggctcccaaatgactttgggc
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gttcccagaccagatgtaccagtttccacgagatgttgtttctgttcctgctcctcctgccttg
cctcagccagggccagtcacaaatgccccggaagaagagatccttgatctccttacccaaacaa
acttcgtcactcaacctgggctctctattgagccggccgttggacctgaagaagaacctgatgt
cgcagatcttggagggtctccagcaccagcagtcagcagcaccacagagtccagtgccgacgag
gacgaggacgacgacacctcctcctctggcgaccacagaggaggaggaggaggggtcatgggag
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caccagcgacacccctttctccttcagccccgtaccagtgcaccaccacggacccccaacgctt
ctcccgacctcacgcccgacacgcgatctggcccgtgggcgcccgtctttccgccagtacgagc
cattgaaaggccggtgtgcggactcgactacgtttggtcgtccgtcttgggccgccccgtgtgc
agtctacaacactgcggagctgactcgtcgtggagcaggtgtccgagttgtgaaggggtcaaga
ccaggtgcgatctctggaaagtga

FIG._34

MEMFRGVVHVSANFINFVNDNWWCCFYQLEEDDWPRLQGWERLIAHLIVKVAGEFAVPGGSTLG
LQYFLQAEHNHFDEGFHVHVVVGGPFVTPRNVCNIVETGFNKVLRELTEPTYEVSFKPAISKKG
KYARDGFDFVTNYLMPKLYPNVVYSVTNFSEYEYVCNSLAYRRNMHKKALTNTADEGEGTSTNS
EWGPEPKKQKTGTVRGEKFVSLVDSLIERGIFTENKWKQVDWLKEYACLSGSVAGVHQIKTALT
LAISKCNSPEYLCELLTRPSTINFNIKENRICKIFLQNDYDPLYAGKVFLAWLGKELGKRNTIW
LFGPPTTGKTNIAMSLATAVPSYGMVNWNNENFPFNDVPHKSIILWDEGLIKSTVVEAAKAILG
GQNCRVDQKNKGSVEVQGTPVLITSNNDMTRVVSGNTVTLIHQRALKDRMVEFDLTVRCSNALG
LIPAEECKQWLFWSQHTPCDVFSRWKEVCEFVAWKSDRTGICYDFSENEDLPGTQTPLLNSPVT
SKTSALKKTIAALATAAVGTLQTSLTNNNWESSEDSGSPPRSSTPLASPERGEVPPGQQWELNT
SVNSVNALNWPMYTVDWVWGSKAQRPVCCLEHDTESSVHCSLCLSLEVLPMLIENSINQPDVIR
CSAHAECTNPFDVLTCKKCRELSALWSFVKYD

FIG._35

atggaaatgtttcggggtgttgtacatgtttctgctaactttattaactttgttaacgataatt
ggtggtgttgtttttaccagttagaggaagatgactggccgcggctgcaaggctgggaaagact
tatagctcacttaattgttaaagtagcaggagaatttgctgttccgggaggcagtactttaggg
ctgcaatatttttacaagctgaacataaccactttgatgagggatttcatgtgcatgtagtag
ttgggggaccgtttgttactcccaggaatgtgtgtaatattgtagaaacaggctttaacaaagt
tttgagggaacttacagagcctacttatgaggtgtcttttaagcctgccatttctaagaaagga
aagtatgctagagatggatttgactttgtaacaaactatttaatgccaaaactgtatcctaatg
ttgtttactctgttacaaatttttcagagtatgagtatgtatgtaattctttagcttacagaag
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gagtggggaccagaaccaaaaaaacagaaaactggtaccgtgcgaggagaaaagtttgttagtt
tggttgactctttaatagagcgtggcatatttacagaaaacaagtggaagcaggtagattggct
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ctttttggaccgcctactactggtaaaacaaatatagctatgagtcttgccactgcagtaccca
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gggcaaaattgcagagtggatcaaaaaaataagggcagtgtagaagttcagggcactcccgttc
tgatcactagcaacaatgacatgactcgcgtggtgtcaggcaacactgttacgcttatccatca
gagggcgctaaaggatcgcatggttgagtttgacttgactgtgagatgctctaatgcccttgga
ttaattcccgctgaggaatgtaagcagtggttgttctggtcacagcatactccttgtgatgttt
tctcaaggtggaaggaagtctgtgagtttgttgcttggaaaagtgacagaacagggatttgcta
tgacttctcagaaaacgaagatcttccggggactcagacccctctgctgaacagcccagtgacc
tcgaagacatcagcattgaagaaaacgatagcggcattagcaactgcagcggttggaacattac
agacctccctcacaaacaacaactgggagtcctctgaggatagcggttccccgccccgcagcag
caccccacttgcatctcctgagcgaggcgaagttcccccggacagcagtgggaactgaacacc
tcagtaaactctgtaaatgctttaaactggcctatgtatacagtggattgggtttggggatcta
aggctcaaagacctgtgtgttgcttagagcatgatacagaaagttcagtgcattgttctttgtg
cttaagtttagaggtgttgcctatgttaattgaaaacagtattaaccagcccgatgtaattagg
tgctctgctcatgctgagtgtactaatccttttgatgtgcttacctgtaagaaatgtcgagagc
tgagtgcactgtggagttttgttaagtatgactga

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FIG._36

MEMYRGVIQVNANFTDFANDNWWCCFFQLDVDDWPELRGPERLMAHYICKVAALLDTPSGPFLG
CKYFLQVEGNHFDNGFHIHVVIGGPFLTPRNVCSAVEGGFNKVLADFTSPTITVQFKPAVSKKG
KYHRDGFDFVTYYLMPKLYPNVIYSVTNLEEYQYVCNSLCYRRTMHKRQQPCNGGSVEQSSVSL
YSDGEPANKKSKVVTVRGEKFCSLVDSLIERNIFNENKWKETDFKEYAALSASVAGVHQIKTAL
TLAVSKCNSPAYLGEILTRPNTINFNIRENRIANIFLSNNYCPLYAGKMFLAWVQKQLGKRNTI
WLFGPPSTGKTNIAMSLASAVPTYGMVNWNNENFPFNDVPYKSIILWDEGLIKSTVVEAAKSIL
GGQPCRVDQKNKGSVEVSGTPVLITSNSDMTRVVCGNTVTLVHQRALKDRMVRFDLTVRCSNAL
GLIPADEAKQWLWWAQNNACDAFTQWHLSSDHVAWKVDRTTLCHDFQSEPEPDSELPSSGESVE
SFDRSDLSTSWLDVQDQSSSPENSDVEWDIADLLSNEHWIDDLQEDSCSPPRCSTPVAVAEPVE
VPTGTGGGLKWEKNYSVHDTNELRWPMFSVDWVWGTNVKRPVCCLEHDKEFGVHCSLCLSLEVL
PMLIEKSILVPDTLRCSAHGDCTNPFDVLTCKKCRDLSGLMSFLEHE

FIG._37

Replacement Sheet

atggagatgtatagaggagttattcaggtaaatgctaactttactgactttgctaacgataact
ggtggtgctgctttttttcagttagatgtagatgactggccggagcttagaggacccgagaggct
tatggctcactacatttgtaaagtggctgctttactggacacccccctctgggccttttttgggt
tgcaagtatttttgcaagtggagggcaaccattttgataatgggtttcacattcatgtggtga
ttgggggaccatttctaactcctagaaatgtgtgttctgctgtggaaggggttttaacaaagt
gttagcagactttacaagccctactatcactgttcagtttaaacctgctgttagtaaaaagggg
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aacaatgcataaaaggcaacaaccatgtaatgggggtctgttgaacagtccagtgtttctttg
tattctgatggagaacctgcaaacaagaaaagcaaggttgtaactgttagaggggagaaattct
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ctataaatttaacattagagaaaacagaattgctaacatttttttaagtaacaactattgccc
tctgtatgctgggaaaatgtttttagcttgggtgcagaaacagcttggtaaaaggaatactatt
tggctgtttggtcctcccagtactggtaaaactaacattgcaatgagtttggcctctgctgttc
caacatatggcatggtaaactggaacaatgaaaattttccgtttaatgatgtaccttataaaag
cattattttgtgggacgagggactaataaagtccacggttgttgaagcagcaaaaagtatttta
ggaggtcagccatgtagagttgatcagaaaaataagggcagcgtggaagtcagtggcactcctg
tgctcattaccagcaacagtgacatgactagagtggtgtgcggtaacactgtgacccttgtcca
tcagcgagctttgaaggatcgcatggttcgatttgatctgactgtgagatgctctaatgctctg
ggattaatccctgctgatgaggccaagcagtggctttggtgggcacagaataacgcgtgtgacg
cctttactcaatggcatctgtctagtgatcacgttgcttggaaagtggaccgtacaacgctgtg
tcatgacttccagagcgagccggagccagacagcgaactccctagtagcggggagtcagttgag
agctttgacagaagcgacctctcaacctcctggcttgacgtccaagatcagtcaagcagtcctg
aaaactctgatgtcgagtgggacatcgcagacctcctctcaaacgagcactggatcgacgacct
gcaagaagatagctgttccccgccccgctgcagcaccccagtggcagtggctgagccagtcgaa
gttcccaccggaaccggaggaggactgaagtgggaaaaaaactattctgttcatgatactaatg
aactgagatggcctatgttttctgttgattgggtgtggggtacaaatgttaaacgtccagtgtg
ctgtttagagcacgataaggagtttggtgtgcattgcagtttgtgtttgtctttggaggttttg
cctatgcttattgaaaaaagcattctggtaccagacactctaagatgttctgctcatggtgatt
gtactaatccttttgacgtgcttacgtgtaagaaatgccgagatctgagtggtttaatgagctt
tttagagcatgagtga

FIG._38

MDMFRGVIQLTANITDFANDSWWCSFLQLDSDDWPELRGVERLVAIFICKVAAVLDNPSGTSLG
CKYFLQAEGNHYDAGFHVHIVIGGPFINARNVCNAVETTFNKVLGDLTDPSMSVQFKPAVSKKG
EYYRDGFDFVTNYLMPKLYPNVIYSVTNLEEYQYVCNSLCYRKNMHKQHMVSTVDASSSSFMND
MYEPATKRSKSCTVKGEKFRNLVDSLIERNIFSESKWKEVDFNEFARLSASVAGVHQIKTAITL
AVSKCNSPDYLFQILTRPSTIHFNIKENRIAQIFLNNNYCPLYAGEVFLFWIQKQLGKRNTVWL
YGPPSTGKTNVAMSLASAVPTYGMVNWNNENFPFNDVPYKSLILWDEGLIKSTVVEAAKSILGG
QPCRVDQKNKGSVEVTGTPVLITSNSDMTRVVWYTVTLVHQRALKDRMVRFDLTVRCSNALGLI
PADEAKQWLWWAQSQPCDAFTQWHQVSEHVAWKADRTGLFHDFSTKPEQESNAKSSGKSNDSFA
GSDLANLSWLDVEDTSSSSESDLSGDIAELVSNDNWLQSGCPPTRCSTPVTVVEPKQVSPGTGG
GLTKWEKNYSVHQENELAWPMFSVDWVWGSHVKRPVCCVEHDKDLVLPHCNLCLSLEVLPMLIE
KSINVPDTLRCSAHGDCTNPFDVLTCKKCRDLSGLMSFLEHDQ

FIG._39

atggacatgttccggggagttattcaactgactgctaacattactgactttgctaacgatagct
ggtggtgtagctttttgcagttagattcagatgactggccggagctgagaggtgtcgagagact
agttgctatttttatttgtaaagtagctgctgtattagacaacccctctggtacatctcttggc
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ttgggggacctttcattaatgctagaaatgtatgtaatgctgttgaaactacttttaacaaggt
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gagtattacagagatggttttgactttgtgactaactacttaatgccaaaactgtatcctaatg
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gcagtgtcaaagtgtaattcaccagactatctgtttcaaattttaactagacccagtactattc
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tgctggagaagtattcctcttttggattcaaaagcaattaggaaaaagaaacactgtgtggttg
tatgggcctcctagtactggcaaaacaaatgtggctatgagcttagcgtctgcagtgcctactt
atggcatggttaactggaataatgaaaactttccatttaatgatgtgccttataaaagtttaat
actgtgggacgaagggcttattaaaagtacagttgtagaggcagcaaaaagtattctgggaggt
caaccatgtagggttgatcaaaagaataaaggcagtgtagaagtcacaggcactcctgttctta
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aatggcaccaggtcagtgagcacgttgcttggaaggcggaccgtacaggcttgttccatgactt
cagtacaaagccggagcaggagtcaaacgcaaagtcaagcggaaaatcaaatgactcctttgca
ggaagcgacctcgcaaatctctcctggcttgacgttgaagatacctcgagctcttcggagtctg
atctcagcggggacattgcagaactcgtctccaacgacaactggctccagagtggctgtccccc
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ggattaacaaagtgggaaaaaaattattcagttcatcaagaaaatgagctagcatggcctatgt
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ggaccttgtactgcctcattgtaatttgtgcttgtctctcgaagtgttgcctatgttaattgag
aaaagtattaatgttccagatactttgcgatgttcagctcatggtgattgtactaatccatttg
atgttttaacttgtaagaagtgtagagatctcagtggccttatgagtttttagaacatgaccagtag

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FIG._40

MELFRGVLQVSSNVLDCANDNWWCSLLDLDTSDWEPLTHTNRLMAIYLSSVASKLDFTGGPLAG
CLYFFQVECNKFEEGYHIHVVIGGPGLNPRNLTVCVEGLFNNVLYHLVTENVKLKFLPGMTTKG
KYFRDGEQFIENYLMKKIPLNVVWCVTNIDGYIDTCISATFRRGACHAKKPRITTAINDTSSDA
GESSGTGAEVVPINGKGTKASIKFQTMVNWLCENRVFTEDKWKLVDFNQYTLLSSSHSGSFQIQ
SALKLAIYKATNLVPTSTFLLHTDFEQVMCIKDNKIVKLLLCQNYDPLLVGQHVLKWIDKKCGK
KNTLWFYGPPSTGKTNLAMAIAKSVPVYGMVNWNNENFPFNDVAGKSLVVWDEGIIKSTIVEAA
KAILGGQPTRVDQKMRGSVAVPGVPVVITSNGDITFVVSGNTTTTVHAKALKERMVKLNFTVRC
SPDMGLLTEADVQQWLTWCNAQSWDHYENWAINYTFDFPGINADALHPDLQTTPIVTDTSISSS
GGESSEELSESSFFNLITPGAWNTETPRSSTPIPGTSSGESFVGSSVSSEVVAASWEEAFYTPL
ADQFRELLVGVDYVWDGVRGLPVCCVQHINNSGGGLGLCPHCINVGAWYNGWKFREFTPDLVRC
SCHVGASNPFSVLTCKKCAYLSGLQSFVDYE

FIG._41

atggagctatttagaggggtgcttcaagtttcttctaatgttctggactgtgctaacgataact
ggtggtgctctttactggatttagacacttctgactgggaaccactaactcatactaacagact
aatggcaatatacttaagcagtgtggcttctaagcttgactttaccgggggccactagcgggg
tgcttgtacttttttcaagtagaatgtaacaaatttgaagaaggctatcatattcatgtggtta
ttgggggccagggttaaaccccagaaacctcacagtgtgtgtagaggggttatttaataatgt
actttatcaccttgtaactgaaaatgtaaagctaaaatttttgccaggaatgactacaaaaggc
aaatactttagagatggagagcagtttatagaaaactatttaatgaaaaaaataccttaaatg
ttgtatggtgtgttactaatattgatggatatatagatacctgtatttctgctacttttagaag
gggagcttgccatgccaagaaaccccgcattaccacagccataaatgacactagtagtgatgct
ggggagtctagcggcacaggggcagaggttgtgccaattaatgggaagggaactaaggctagca
taaagtttcaaactatggtaaactggttgtgtgaaaacagagtgtttacagaggataagtggaa
actagttgactttaaccagtacactttactaagcagtagtcacagtggaagttttcaaattcaa
agtgcactaaaactagcaatttataaagcaactaatttagtgcctacaagcacatttctattgc
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aaactatgacccctattagtggggcagcatgtgttaaagtggattgataaaaaatgtggcaag
aaaaatacactgtggttttatgggccgccaagtacaggaaaaacaaacttggcaatggccattg
ctaaaagtgttccagtatatggcatggttaactggaataatgaaaactttccatttaatgatgt
agcagggaaaagcttggtggtctgggatgaaggtattattaagtctacaattgtagaagctgca
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ctggagtacctgtggttataaccagcaatggtgacattacttttgttgtaagcgggaacactac
aacaactgtacatgctaaagccttaaaagagcgaatggtaaagttaaactttactgtaagatgc
agccctgacatggggttactaacagaggctgatgtacaacagtggcttacatggtgtaatgcac
aaagctgggaccactatgaaaactgggcaataaactacacttttgatttccctggaattaatgc
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ggtggtgaaagctctgaagaactcagtgaaagcagctttttaacctcatcaccccaggcgcct
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cggaagctcagtttcctccgaagttgtagctgcatcgtgggaagaagccttctacacacctttg
gcagaccagtttcgtgaactgttagttggggttgattatgtgtgggacggtgtaaggggtttac
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agctgccatgtgggagcttctaatccctttctgtgctaacctgcaaaaaatgtgcttacctgt
ctggattgcaaagctttgtagattatgagtaa

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FIG._42

MELFRGVLQVSSNVLDCANDNWWCSLLDLDTSDWEPLTHTNRLMAIYLSSVASKLDFTGGPLAG
CLYFFQVECNKFEEGYHIHVVIGGPGLNPRNLTMCVEGLFNNVLYHLVTENVKLKFLPGMTTKG
KYFRDGEQFIENYLIKKIPLNVVWCVTNIDGYIDTCISATFRRGACHAKKPRITTAINDTSSDA
GESSGTGAEVVPFNGKGTKASIKFQTMVNWLCENRVFTEDKWKLVDFNQYTLLSSSHSGSFQIQ
SALKLAIYKATNLVPTSTFLLHTDFEQVMCIKDNKIVKLLLCQNYDPLLVGQHVLKWIDKKCGK
KNTLWFYGPPSTGKTNLAMAIAKSVPVYGMVNWNNENFPFNDVAGKSLVVWDEGIIKSTIVEAA
KAILGGQPTRVDQKMRGSVAVPGVPVVITSNGDITFVVSGNTTTTVHAKALKERMVKLNFTVRC
SPDMGLLTEADVQQWLTWCNAQSWDHYENWAINYTFDFPGINADALHPDLQTTPIVTDTSISSS
GGESSEELSESSFLNLITPGAWNTETPRSSTPIPGTSSGESFVGSPVSSEVVAASWEEAFYTPL
ADQFRELLVGVDYVWDGVRGLPVCCVQHINNSGGGLGLCPHCINVGAWYNGWKFREFTPDLVRC
SCHVGASNPFSVLTCKKCAYLSGLQSFVDYE

FIG._43

atggagctatttagaggggtgcttcaagtttcttctaatgttctggactgtgctaacgataact
ggtggtgctctttactggatttagacacttctgactgggaaccactaactcatactaacagact
aatggcaatatacttaagcagtgtggcttctaagcttgactttaccgggggggccactagcaggg
tgcttgtactttttttcaagtagaatgtaacaaatttgaagaaggctatcatattcatgtggtta
ttgggggggccagggttaaaccccagaaacctcactatgtgtgtagaggggttatttaataatgt
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gggagcttgccatgccaagaaaccccgcattaccacagccataaatgatactagtagtgatgct
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aacaactgtacatgctaaagccttaaaagagcgcatggtaaagttaaactttactgtaagatgc
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agatgccctccacccagacctccaaaccaccccaattgtcacagacaccagtatcagcagcagt
ggtggtgaaagctctgaagaactcagtgaaagcagctttcttaacctcatcaccccaggcgcct
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cggaagcccagtttcctccgaagttgtagctgcatcgtgggaagaagctttctacacacctttg
gcagaccagtttcgtgaactgttagttggggttgattatgtgtgggacggtgtaaggggtttac
ctgtgtgttgtgtgcaacatattaacaatagtgggggaggcttgggactttgtccccattgcat
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agctgccatgtgggagcttctaatccctttttctgtgctaacctgcaaaaaatgtgcttacctgt
ctggattgcaaagctttgtagattatgagtaa

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FIG._44

MFSIINPSDDFWTKDKYIMLTIKGPVEWEAEIPGISTDFFCKFSNVPVPHFRDMHSPGAPDIKW
ITACTKMIDVILNYWNNKTAVPTPAKWYAQAENKAGRPSLTLLIALDGIPTATIGKHTTEIRGV
LIKDFFDGNAPKIDDWCTYAKTKKNGGGTQVFSLSYIPFALLQIIRPQFQWAWTNINELGDVCD
EIHRKHIISHFNKKPNVKLMLFPKDGTNRISLKSKFLGTIEWLSDLGIVTEDAWIRRDVRSYMQ
LLTLTHGDVLIHRALSISKKRIRATRKAIDFIAHIDTDFEIYENPVYQLFCLQSFDPILAGTIL
YQWLSHRRGKKNTVSFIGPPGCGKSMLTGAILENIPLHGILHGSLNTKNLRAYGQVLVLWWKDI
SINFENFNIIKSLLGGQKIIFPINENDHVQIGPCPIIATSCVDIRSMVHSNIHKINLSQRVYNF
TFDKVIPRNFPVIQKDDINQFLFWARNRSINCFIDYTVPKIL

FIG._45

atgttttccataataaatccaagtgatgatttttggactaaggacaaatatatcatgttgacta
tcaaaggccccgtggagtgggaggcagaaatccctggaatatctacggatttttttgcaaatt
ctctaacgtgcccgtgccacatttagagatatgcactcaccgggagcgcccgatattaaatgg
ataactgcatgtaccaaaatgatcgatgtcatactcaattactggaataataaaactgccgtcc
ccacccctgcaaagtggtacgctcaagcggagaataaagctggcagaccctccttaacattatt
gatagctttagatggaattcccaccgcaacgataggaaaacacacaacggaaatcaggggtgta
ttaattaaagatttcttcgacgggaacgcccctaaaatagatgattggtgcacgtatgccaaaa
caaagaaaaatggtggcggaacccaggtcttcagtctaagttatatccccttttgcccttcttca
aattattagaccacagttccaatgggcatggacaaatattaacgaactgggagacgtatgcgat
gaaatacatcgaaaacacatcatatcccatttcaataaaaaacctaatgttaaacttatgctgt
ttccaaaggatgggaccaacagaatatctttaaaatctaaatttctgggaaccatcgaatggct
gtctgatcttggaatagtcacggaagacgcgtggatacgaagagacgttagatcatacatgcaa
ttattgacactaacacacggggacgtgctaattcatagggctctatctatatctaaaaaaagaa
taagagcaactagaaaagctatcgattttatagcgcacatagacactgactttgaaatctatga
aaacccggtttaccagttgttctgtctgcagtcttttgaccctatattagcaggaaccatatta
tatcagtggctaagccacagaagagggaaaaaaaacaccgttagttttattggtccacccggat
gtggaaaatcgatgttaacgggagccattcttgaaaatatcccgttacatggaatattacacgg
atctttgaatactaaaaatttaagagcttacggacaggttttagtcttgtggtggaaagacata
agtatcaactttgaaaattttaatattataaaatccctccttgggggtcaaaaaataatattcc
caattaatgaaaacgaccacgtacagataggaccgtgtcccatcatagccacatcttgcgttga
tatacgctcgatggtacattcaaatatccacaaaataaatctatcacagagggtatataatttt
acatttgataaagttatccctcgcaattttcctgtaattcagaaagacgacataaatcaatttc
tgttctgggccagaaaccgttctataaattgttttattgactacacggttccaaaaattttataa

FIG._46

5′-ttggccactccctctctgcgcgctcgctcgctcactgaggccgggcgaccaaaggtcgcc-3′

FIG._47

5′-ggcggttggggctcggcgctcgctcgctcgctgggcgggcggg-3′

FIG._48

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FIG._49A

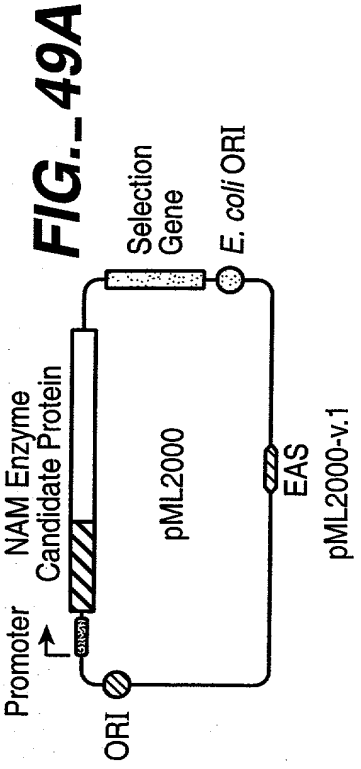

FIG._49B

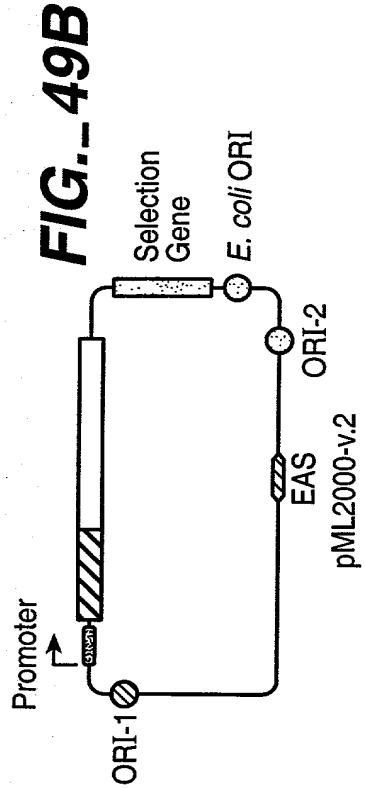

FIG._49C

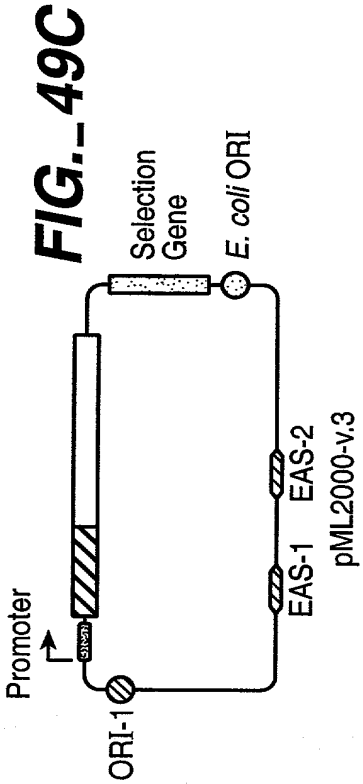

FIG._49D

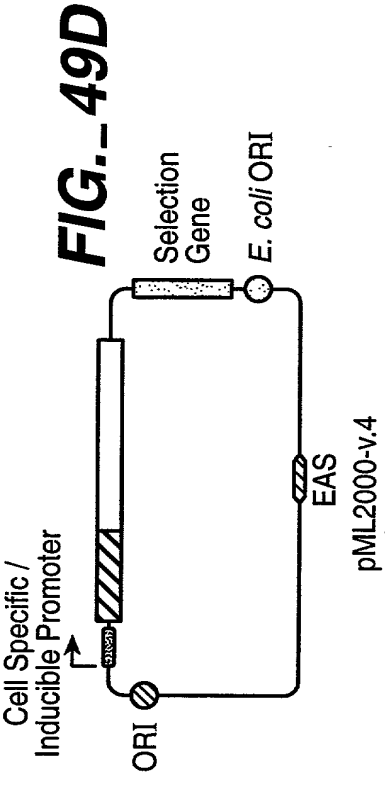

FIG._49E

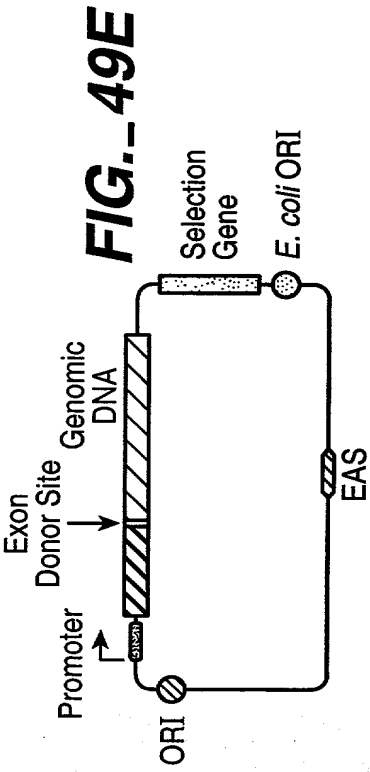

FIG._49F

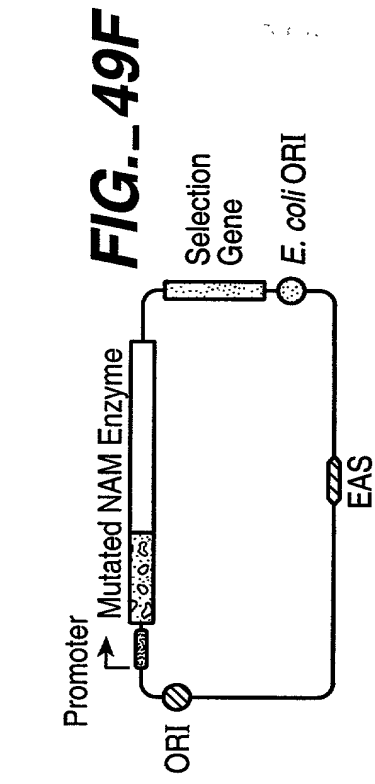

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FIG._49H

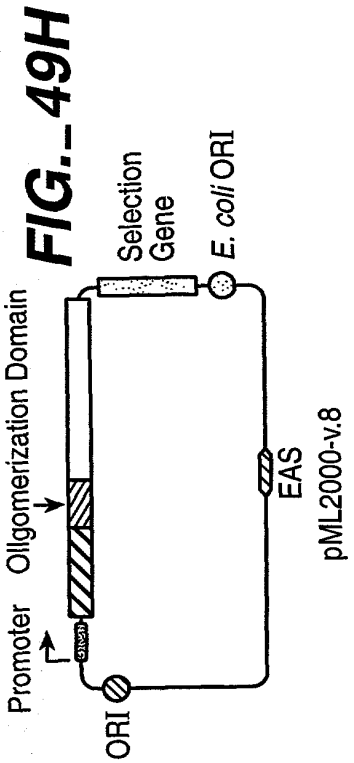


FIG._49J

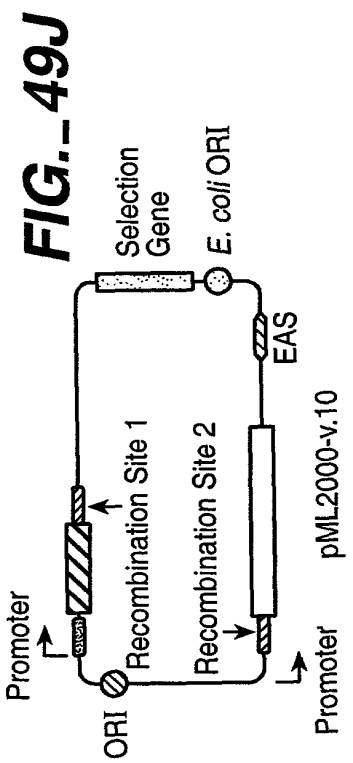


FIG._49L

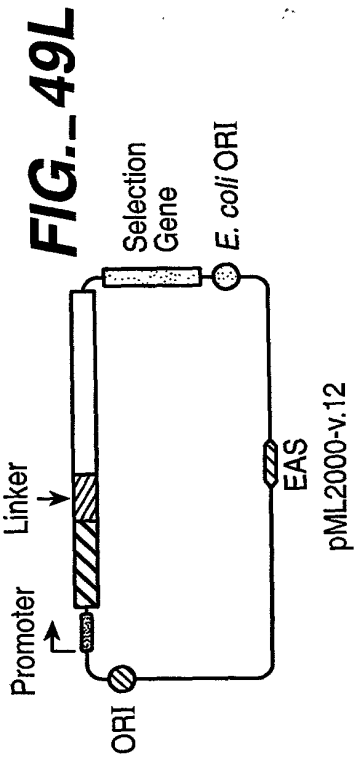


FIG._49G

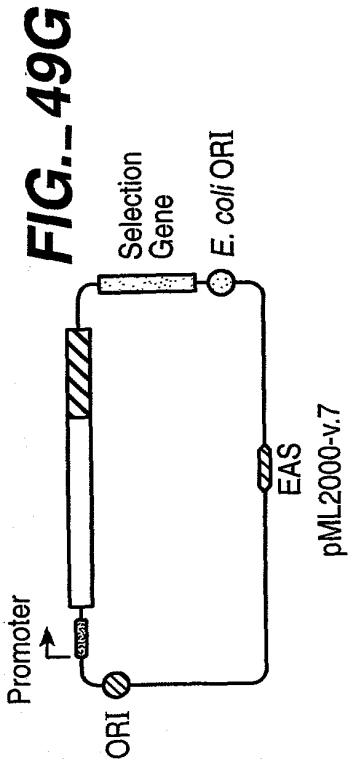


FIG._49I

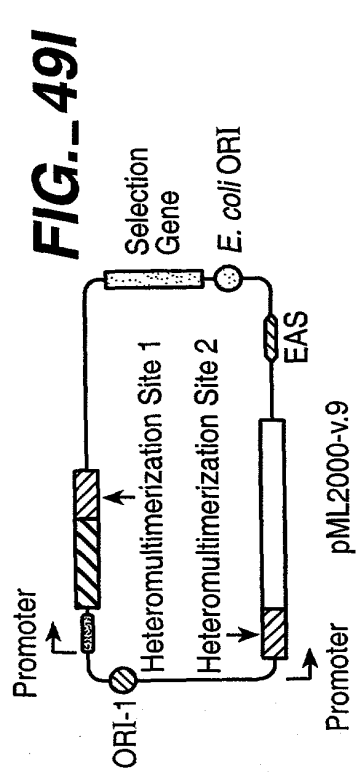


FIG._49K

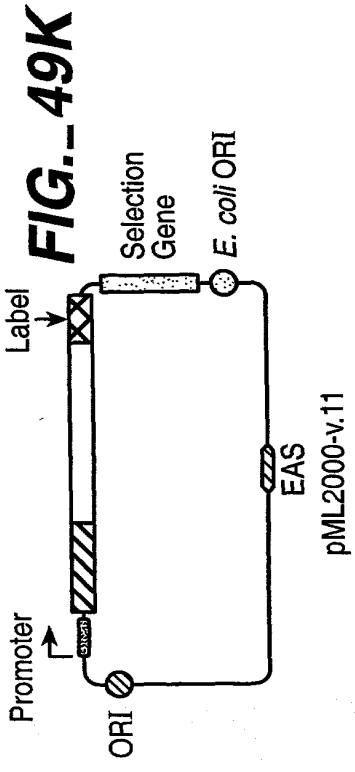


FIG._49N

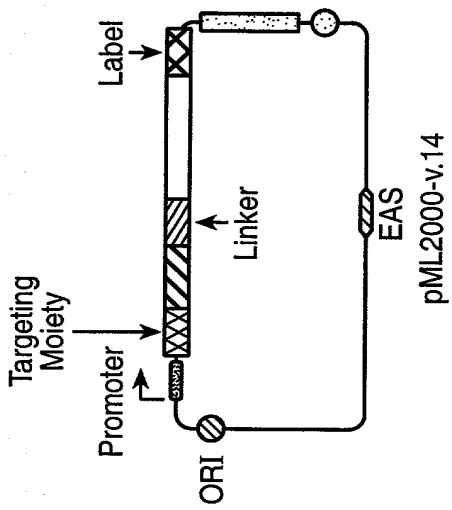
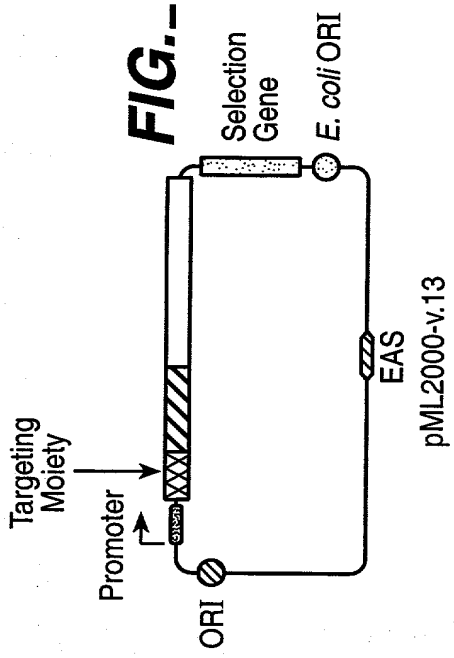


FIG._49M



20050150 v1 (42800.1)

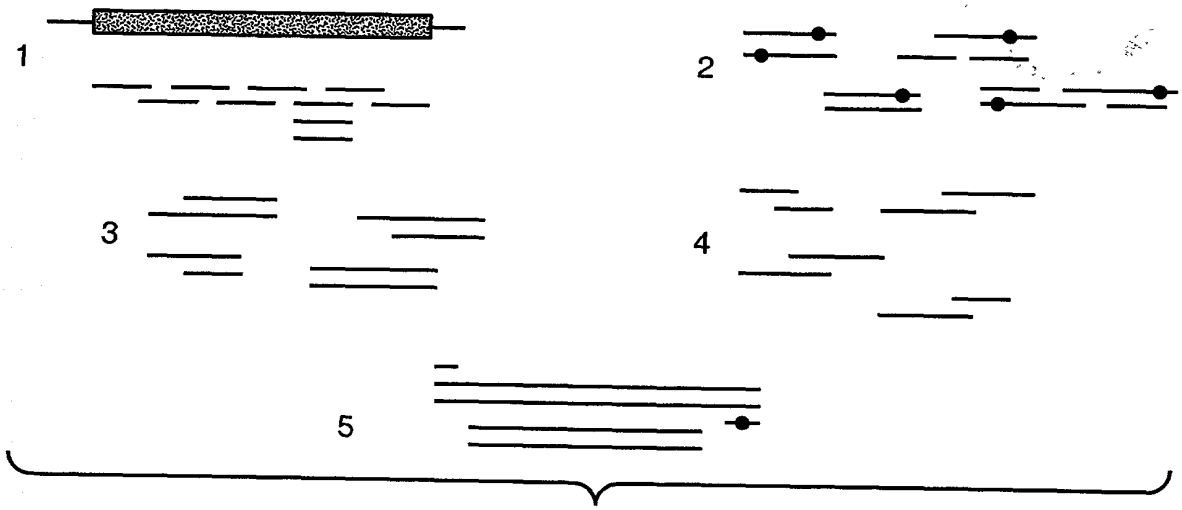


FIG._50

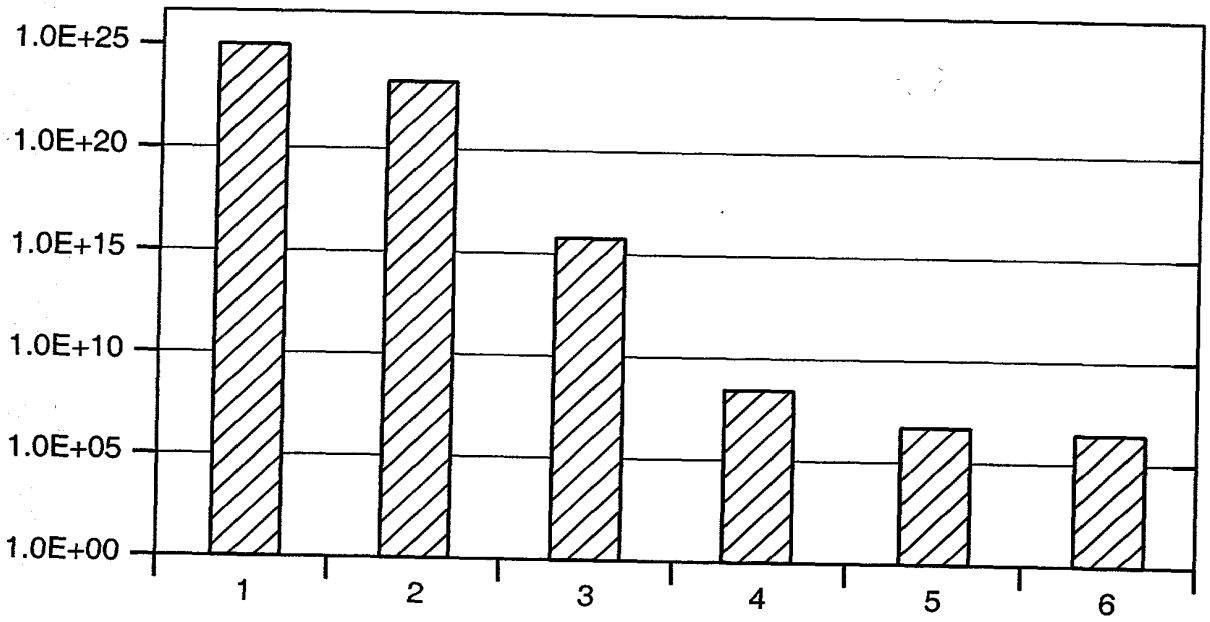


FIG._51

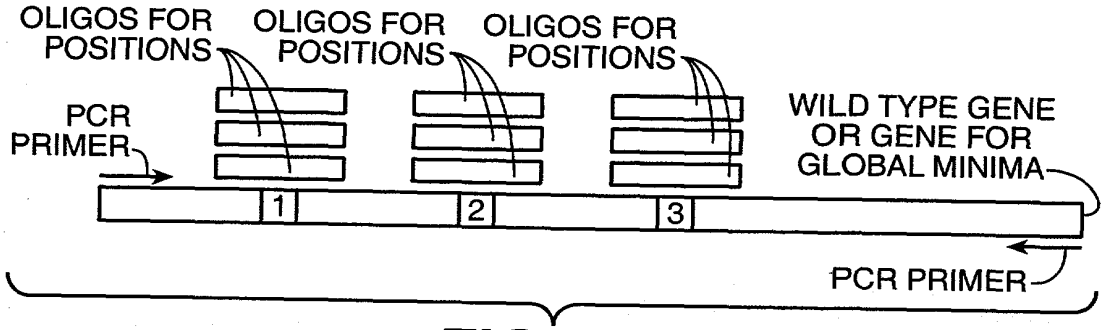
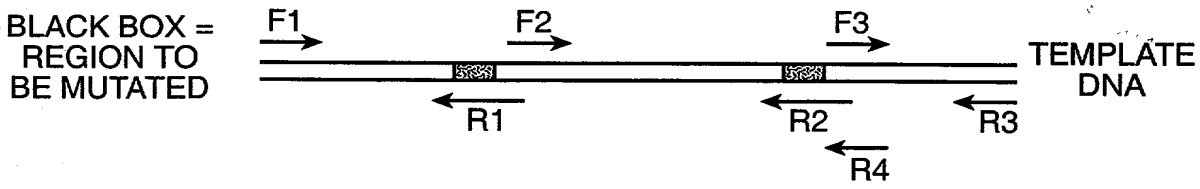


FIG._52

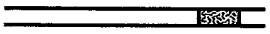
20070134.050702



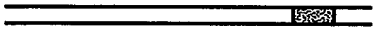
STEP 1: SET UP 3 PCR REACTIONS:

PRODUCTS:

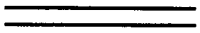
TUBE 1:



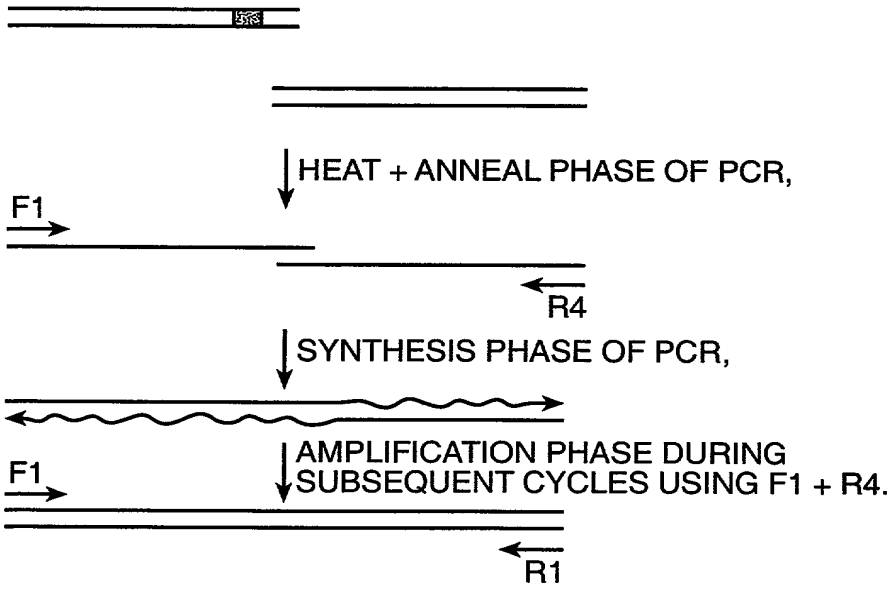
TUBE 2:



TUBE 3:



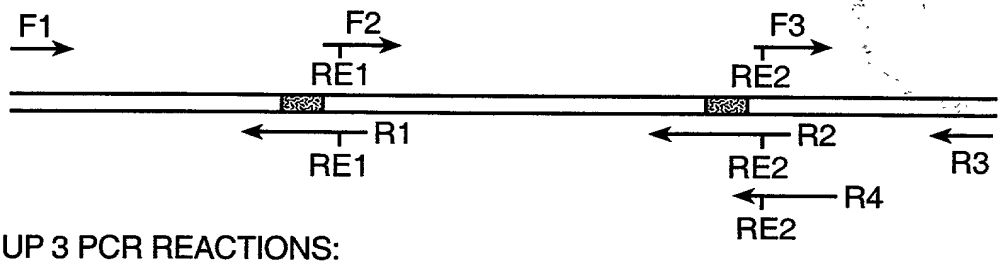
STEP 2: SET UP PCR REACTION WITH PRODUCTS OF TUBE 1 + PRODUCTS TUBE 2 + F1 + R4.



STEP 3: REPEAT STEP 2 USING PRODUCT FROM STEP 2 + PRODUCT FROM STEP 1, TUBE 3 + PRIMERS F1 + R3.

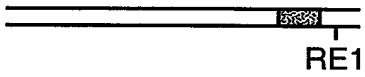
FIG._53

10082671.051702

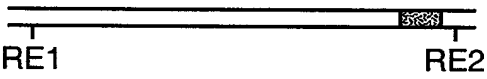


STEP 1: SET UP 3 PCR REACTIONS:

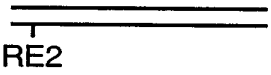
TUBE 1:



TUBE 2:

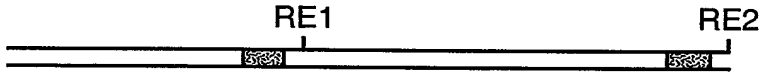


TUBE 3:

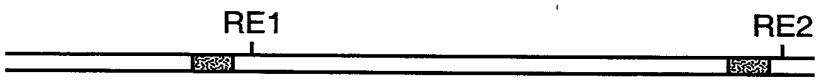


STEP 2: DIGEST PRODUCTS FROM STEP 1 WITH SUITABLE RESTRICTION ENDONUCLEASES.

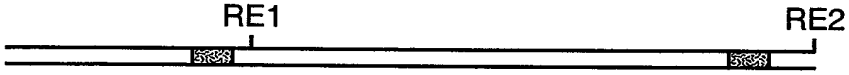
STEP 3: LIGATE DIGESTED PRODUCT FROM STEP 2, TUBE 2 WITH DIGESTED PRODUCT FROM STEP 2, TUBE 1.



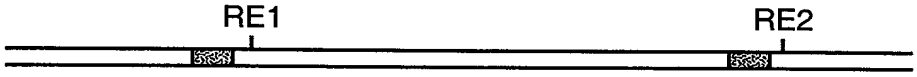
STEP 4: AMPLIFY VIA PCR LIGATED PRODUCTS OF STEP 3 WITH F1 + R4.



STEP 5: DIGEST AMPLIFIED PRODUCT OF STEP 4 WITH RESTRICTION ENDONUCLEASE #2.



STEP 6: LIGATE PRODUCT FROM STEP 5 WITH PRODUCT FROM STEP 2, TUBE 1.



STEP 7: AMPLIFY PRODUCT FROM STEP 6 WITH F1 + R3.

FIG._54

DIAGRAM 3

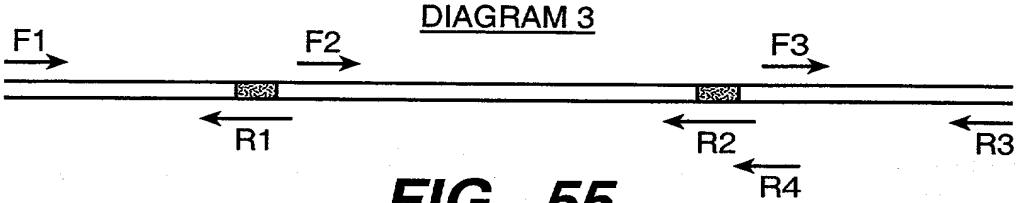


FIG._55

Express Mail No. EV 339 905 704 US

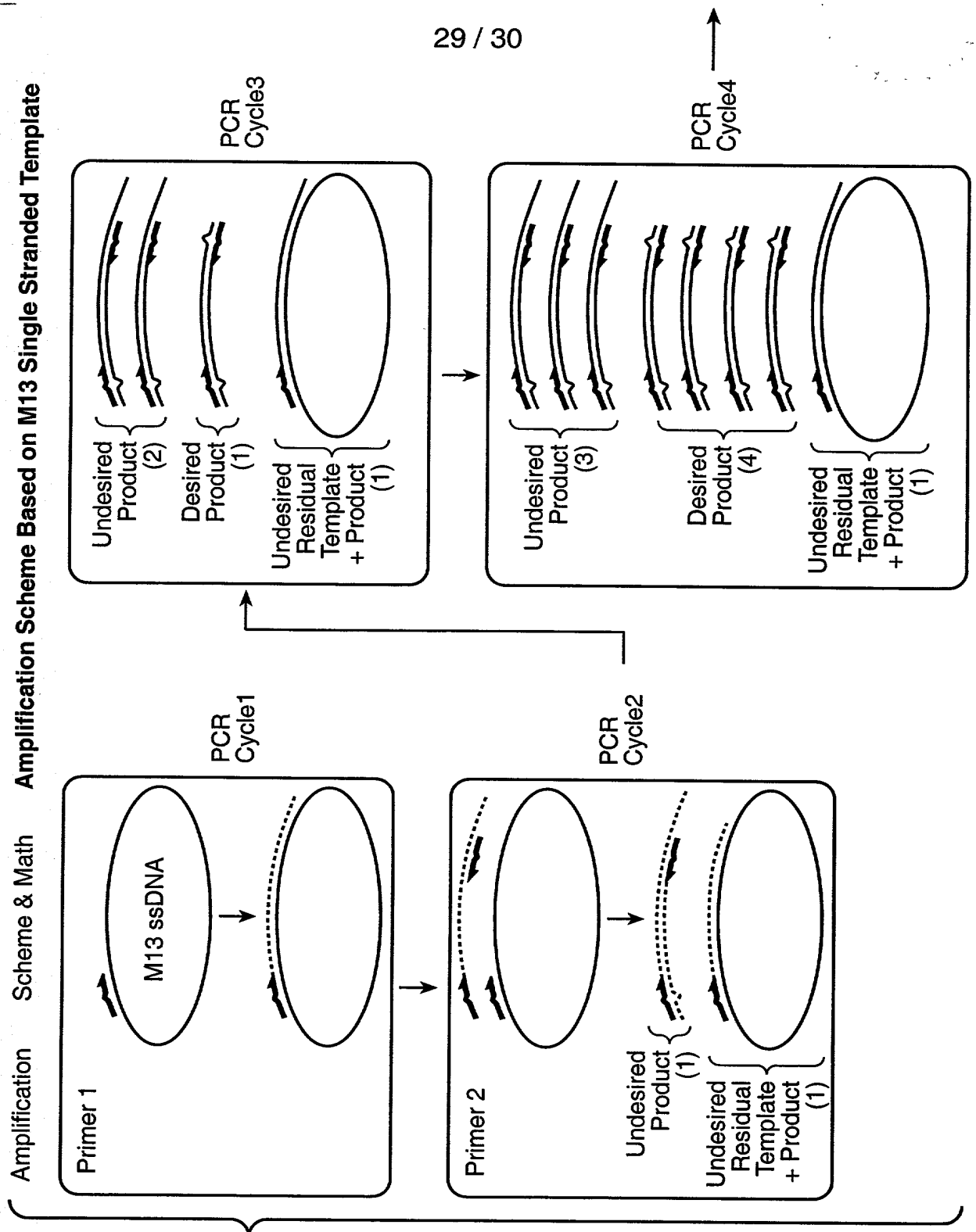
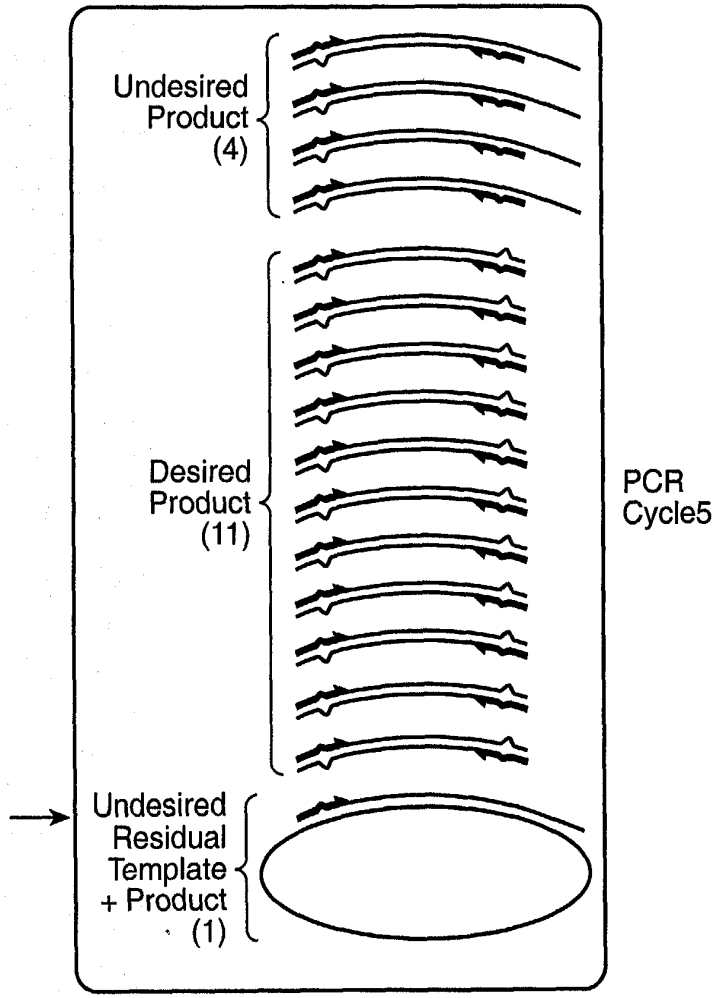

Amplification Scheme & Math
Amplification Scheme Based on M13 Single Stranded Template
Primer 1
M13 ssDNA
PCR Cycle1
Primer 2
PCR Cycle2
Undesired Product (1)
Undesired Residual Template + Product (1)
PCR Cycle3
Undesired Product (2)
Desired Product (1)
Undesired Residual Template + Product (1)
PCR Cycle4
Undesired Product (3)
Desired Product (4)
Undesired Residual Template + Product (1)

FIG._56A

Applicant : Dahiyat et al.
Application No. : 10/082,671
For : USE OF NUCLEIC ACID LIBRARIES TO CREATE TOXICOLOGICAL PROFILES
Attorney : Z. Ying Li, Reg. No. 42,800
Docket No.: XEN/001
Filed : Feb. 22, 2002
Sheet 30 of 30

Amplification Scheme Based on M13 Single Stranded Template



Numerical Progression of Desired Product with Increasing PCR Cycles

PCR Cycles	Desired Product	Undesired Products and Residual Template	Percent Desired Product in Total Product
1		1	
2	0	2	0.00%
3	1	3	25.00%
4	4	4	50.00%
5	11	5	68.75%
6	26	6	81.25%
7	57	7	89.06%
8	120	8	93.75%
9	247	9	96.48%
10	502	10	98.05%
11	1013	11	98.93%
12	2036	12	99.41%
13	4083	13	99.68%
14	8178	14	99.83%
15	16369	15	99.91%
16	32752	16	99.95%
17	65519	17	99.97%
18	131054	18	99.99%
19	262125	19	99.99%
20	524260	20	100.00%

FIG._56B